SECTION 3
BICYCLE AND PEDESTRIAN

3.01 SUMMARY

A. General

The City of Madison, joined by adjacent communities such as the City of Fitchburg, the City of Middleton, the Village of Shorewood Hills, and the City of Monona, has been actively seeking to provide better bicycle and pedestrian accommodations. This has resulted in a tangible increase in bicycling and walking within Dane County. Several communities in the area have distinguished themselves for supporting nonmotorized transportation. In Dane County, the following communities/schools have been designated as bicycle friendly communities by the League of American Bicyclists:

- Madison–Gold Level
- Fitchburg–Bronze Level
- Shorewood Hills–Bronze Level
- University of Wisconsin, Madison–Silver Level

According to the 2011 American Community Survey, Madison ranked 18th in the nation in commuters who bike to work, with 4.7 percent biking. The more recent 2012 American Community Survey has shown the commuter biker percentage has increased. According to the 2000 census, Madison is ranked 10th in the nation for pedestrian commuters, with 11 percent walking to work.

B. Scope

This section reviews bicycle and pedestrian facilities surrounding the Madison Beltline facility and seeks to indicate possible demand for bicycle and pedestrian mobility. It evaluates how existing plans and ongoing projects impact bicycle and pedestrian access within and leading up to the corridor. It also reviews site-specific crossing locations and studies, the relationship between bicycle and pedestrian access, and the broad corridor concepts and strategies that will result from the overall PEL Study.

Figure 3.01-1 on the following page illustrates the study area and existing bicycle and pedestrian infrastructure in the surrounding area.

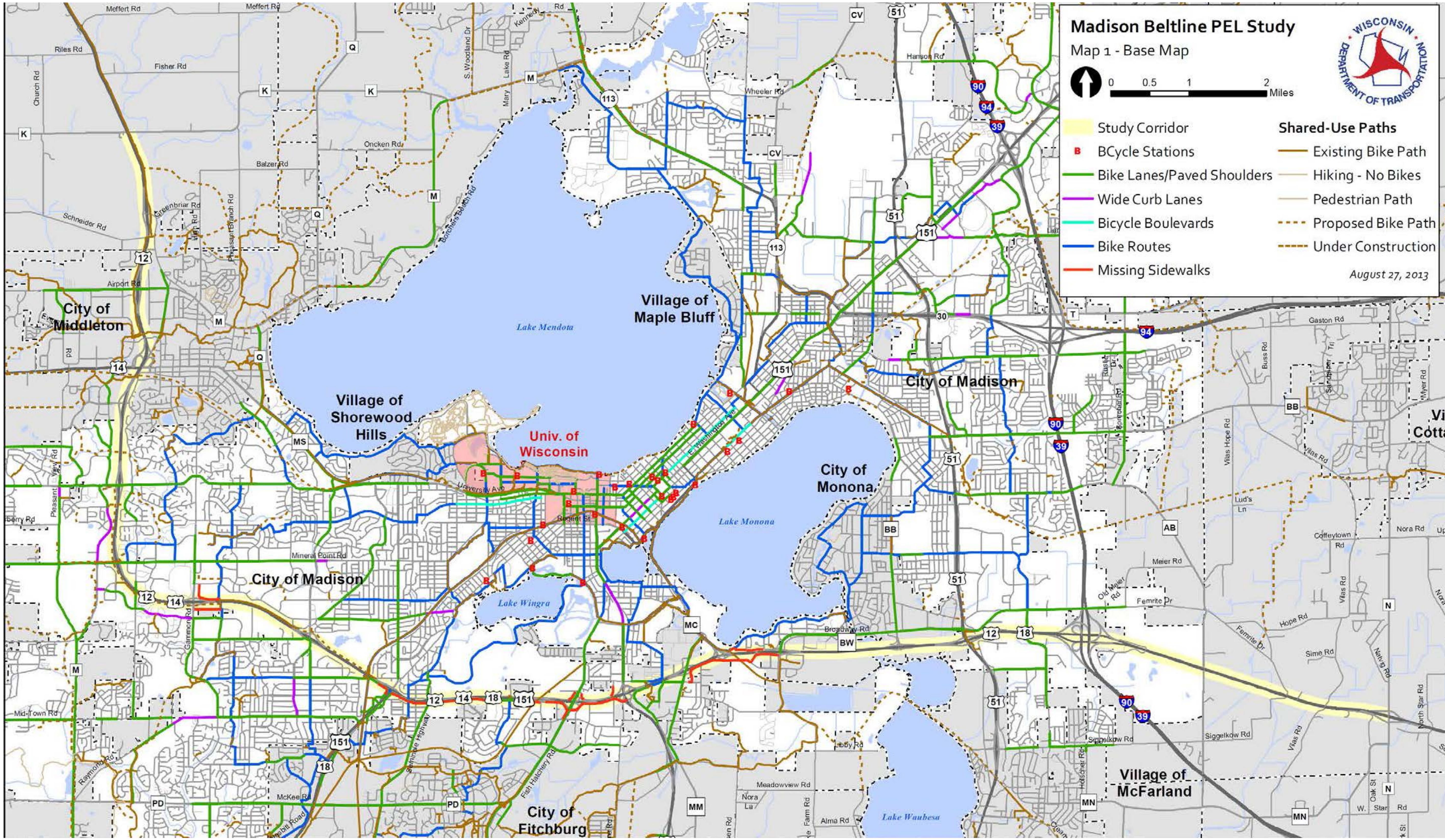

Figure 3.01-1 Existing Bicycle and Pedestrian Facilities

3.02 VOLUMES

Obtaining reliable bike and pedestrian volume counts is difficult. Pedestrians and bicycles often are not confined to designated lanes or locations within a roadway right of way. Also, monitoring equipment often has difficulty detecting bicycles and pedestrians. The most reliable count method is through manual counts, yet these are primarily confined to a peak period and do not include daily volumes which are a common volume unit when discussing traffic.

WisDOT performed manual bicycle and pedestrian counts during the AM- and PM-peak two-hour periods in the summer of 2013 for crossings of the Beltline. Figure 3.02-1 illustrates the bicycle and pedestrian volumes at these crossings during the evening peak hours.

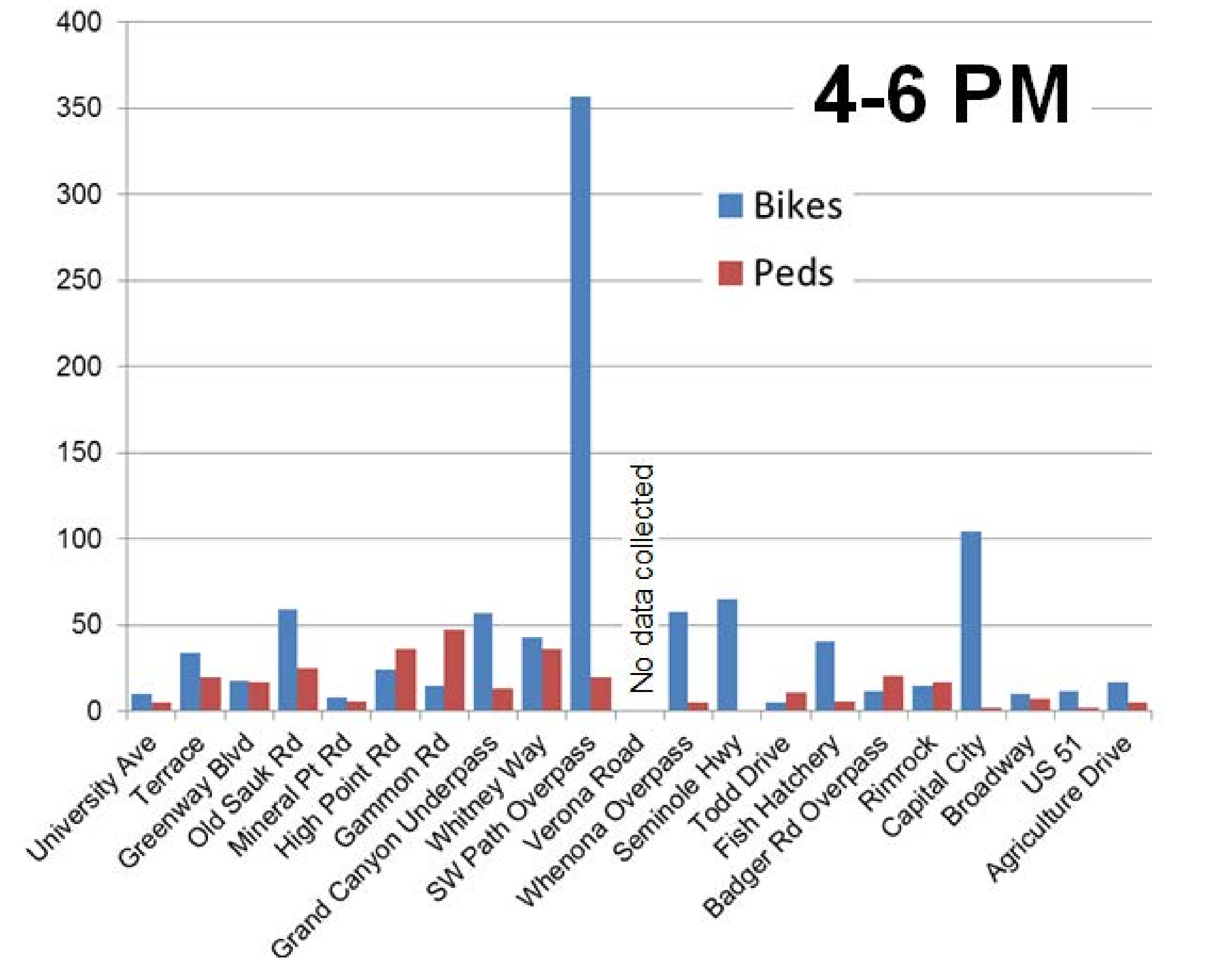

Figure 3.02-1 Bicycle and Pedestrian Crossings of the Beltline–Crossing Volumes

The crossing with the greatest volume is the Southwest Commuter Path overpass followed by the Capital City underpass. These crossing locations also are some of the easiest and most direct routes for bicycle traffic. The Southwest Commuter Path in particular provides access to the government and University employment centers near the Isthmus.

Figure 3.02-2 schematically illustrates this information on a corridor map, with wider arrows representing higher bicycle volumes.

Figure 3.02-2 Schematic Map of Bicycle and Pedestrian Crossings of the Beltline

The City of Madison also monitors bicycle usage along paths. The Capital City path runs adjacent to John Nolen Drive for a portion of its length and crosses the Beltline near the John Nolen Drive interchange. Figure 3.02-3 illustrates average weekday bicycle traffic on the path, taken at Rimrock Road, for 11 months of 2012. This path connects with the second highest Beltline crossing count that was taken. The Capital City trail receives a reasonable amount of bicycle traffic even during the winter months.

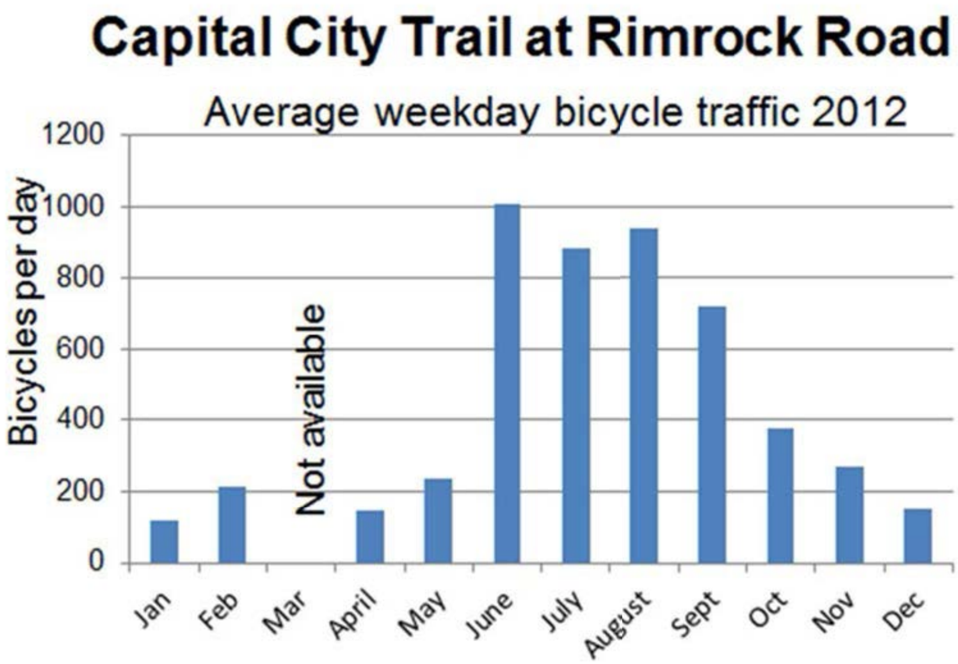

Figure 3.02-3 Bicycle and Pedestrian Crossings of the Beltline

3.03 EXISTING PLANS AND ONGOING PROJECTS

The PEL Study is occurring in a dynamic environment involving multiple agencies, several existing plans, and a variety of ongoing transportation projects. This section summarizes bicycle and pedestrian aspects of these plans and projects. It also recommends modifications to plans and projects. The following list describes the major planned or ongoing projects affecting this study.

A. <u>I-39/90 Corridor Study</u>

The area east of I-39/90 is one of the least-developed portions of the Study Area. However, future growth is anticipated to significantly change the character and traffic patterns of this area. A future planned development which will significantly increase the population in this area is planned for the zone north of the Beltline along Femrite Drive. At this point, there is no timeline for the development. Changes to the transportation network include the closing of the Long Drive crossing and the nearby landfill entrance, reconstruction and capacity expansion to County AB, and extension of Meier Road across the Beltline just east of I-39/90. The Meier Road crossing in particular is a great opportunity for providing the only grade-separated crossing of the Beltline between I-39/90 and County N in Cottage Grove. The future development of the area will likely provide additional opportunities for bicycle and pedestrian enhancements.

B. US 51/Stoughton Road

WisDOT is preparing an Environmental Impact Statement (EIS) of US 51/Stoughton Road from the Beltline to WIS 19. The EIS is scheduled for completion in 2014. Stoughton Road is one of the highest volume interchanges on the Beltline. The EIS is investigating and proposing a number of changes for the area surrounding this interchange. The Beltline/Stoughton Road interchange is planned to be reconstructed as a diverging diamond interchange (DDI) with a shared-use path located in the median under the Beltline. The DDI can improve the motor vehicle efficiency of an interchange while also reducing motor vehicle crashes because of a reduction in conflict points. During the design period, special attention must be given to ensure bicycle and pedestrian access is not limited and the quality of accommodations are not reduced. WisDOT is also considering changes to the adjacent Broadway/Stoughton Road intersection as part of the overall interchange reconstruction. A grade-separated ramp for motor vehicles is planned. This ramp will connect westbound Broadway and southbound Stoughton Road to the westbound Beltline, as shown in Figure 3.03-1. Two grade-separated bicycle and pedestrian crossings are being considered in this area, one crossing Stoughton Road north of the Beltline near the Broadway intersection and the other crossing the Beltline east of Stoughton Road (from Broadway to South Dutch Mill Road).

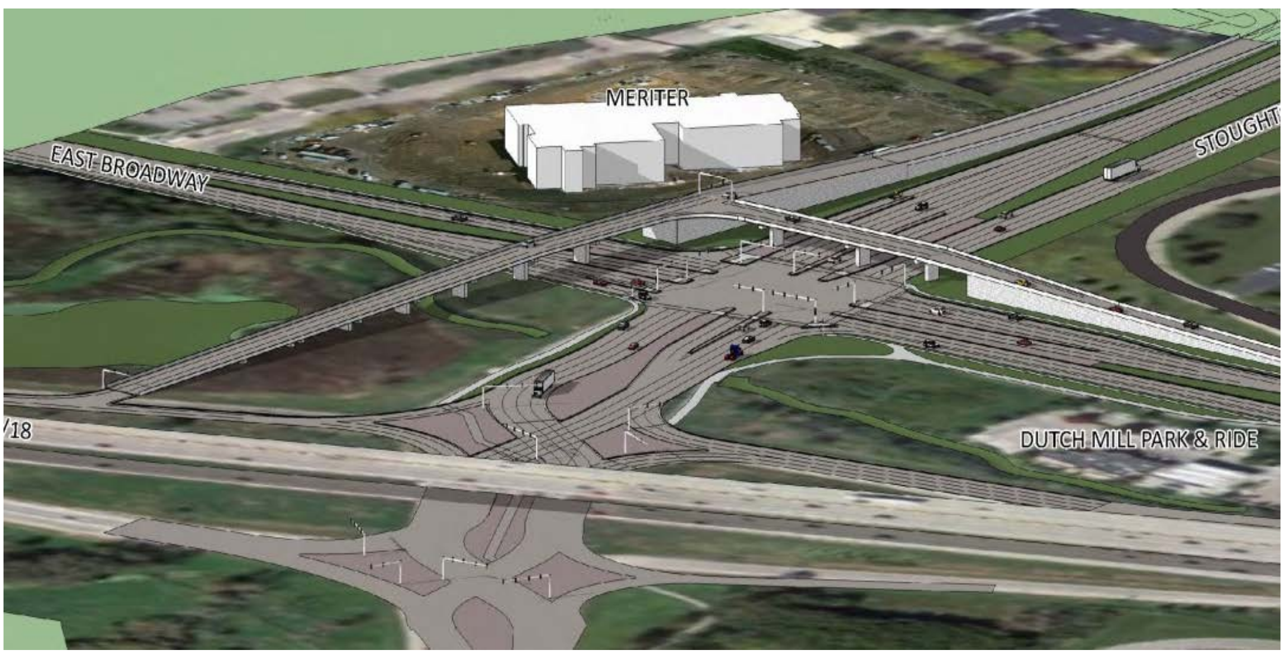

Figure 3.03-1 Grade-Separated Ramp Being Evaluated at Broadway/US 51 Intersection (looking northwest)

C. Cannonball Path

When complete, the Cannonball Path will stretch more than 4 miles from Verona Road near its intersection with County PD/McKee Road, across the Beltline to Fish Hatchery Road. Phase 1 of the project was completed in 2011. Phase 3 includes a new overpass over the Beltline, which was completed in fall 2013. Phases 2 and 4 are slated for construction later in 2013 and 2014.

D. Whenona Drive Bike Grade Separation Over the Beltline

The bike and pedestrian bridge crossing the Beltline at Whenona Drive is being reconstructed as part of the Verona Road interchange project. While this is a dedicated path crossing, it is not as heavily used as the Seminole Highway overpass, approximately one-quarter mile to the east.

E. Verona Road (US 18/151)

The Verona Road/US 18/151 interchange with the Beltline is being reconstructed into a single-point interchange (SPI). There will be bike lanes through the interchange and perpendicular to the Beltline. It will also have a 200-foot-long, 20-foot-wide belowgrade crossing of Verona Road south of the Beltline linking Hammersley Road to the West Beltline Frontage Road. This underpass should greatly improve bicycle and pedestrian access across Verona Road.

F. Beltline Path Near Whitney Way

The Beltline Path parallels the Beltline within its northern right-of-way between the Struck Street Trail underpass (east of Gammon Road) and Medical Circle (near Whitney Way). As part of the Verona Road interchange project, the path will be extended southeasterly to Whitney Way, at which point a wide sidewalk will be constructed running north along the street. In addition, an extension west is also being investigated. If constructed, this extension would pass under Gammon Road to High Point Road. At High Point Road, the path would loop around up to the grade of the crossing and cross over the Beltline heading south.

G. University Avenue Path

In the University Avenue area, a potential east-west path is being considered along the railroad track the crosses underneath the Beltline between University Avenue and Terrace Avenue. In addition, paths along Deming Way connecting existing paths north of University Avenue to existing paths south of Terrace Avenue will be constructed soon. Overall, these improvements will make crossing the Beltline in this area easier, especially since the University Avenue interchange is not very pedestrian- or bike-friendly.

H. Schneider Road Connection

Schneider Road is planned to connect to Belle Fontaine Boulevard in the future as development occurs. This connection will improve overall circulation in the area.

3.04 STAKEHOLDER MEETINGS SUMMARY

Two focus group meetings were held to discuss bicycle and pedestrian considerations as part of the PEL Study. These meetings took place on August 19 and September 16, 2013. A total of 20 people attended each meeting, which lasted approximately 2 1/2 hours. The purpose of these meetings was to provide an overview of the project and discuss existing conditions in terms of crossings of and linear connections along the Beltline.

The stakeholders included representatives from WisDOT; the Madison Area Transportation Planning Board (MATPB); the Wisconsin Bicycle Federation; Dane County Parks, and the cities of Fitchburg, Madison, Middleton, and Monona.

During the meetings, stakeholders discussed ongoing projects (the source of much of the information in the previous section), specific issues in the transportation network that challenge bicycles and pedestrians, and general comments and recommendations regarding potential changes to the Beltline. Discussions are paraphrased from the meeting:

1. It is important to clarify the intended “design cyclist” for this study is defined. Is it the average of all adults that already ride on streets on a daily basis or the average of all adults that ride more than six times per year? Should lower ability riders, such as children, be selected as the design cyclist?

2. Cyclists need noninterchange crossings of the Beltline. However, these types of crossings do not always provide the most useful connections. Therefore, it is also important to improve interchange crossings, which may have very high levels of car traffic. In these instances, bike lanes should be wider than minimum standards and perhaps be buffered from traffic.

3. Separate crossings for pedestrians and bicycles, such as the Struck Street Trail Underpass, are important for less-confident users. Where these exist, they should be preserved or, if they must be removed, they should be replaced nearby.

4. Rural routes that are good for bicyclists eventually turn into arterial streets as development occurs. These routes are then not as comfortable for cycling because of the resulting increase in motor vehicle traffic and speed. Therefore, it is important for road projects to accommodate bicycles when reconstructed or when capacity is increased.

5. The last decade has seen a wave of new traffic control devices and approaches toward bicycle and pedestrian infrastructure. This study should consider innovative approaches and facilities, such as cycle tracks. Another specific example is green pavement. the Federal Highway Administration (FHWA) has recently provided guidance for its use and WisDOT is supportive of this treatment. However, it is important to consider the role of the maintaining entity (cities or the county) in approving the use of innovative treatments.

6. Improvements outside of WisDOT right-of-way will rely on local jurisdiction participation.

3.05 EXISTING AND LATENT DEMAND

Estimating demand for bicycle and pedestrian travel is an important step in determining priority areas for infrastructure improvements. This study performed an analysis where demand (existing and latent) was estimated by the concentration and proximity of various trip generators and destinations. Demand within 1.5 miles of the Beltline is illustrated by two heat maps, one for bicycles and one for pedestrians. Fifteen trip generators and destination types were factored into the development of the heat maps:

1. High population density (more than 55 people per acre)
2. Medium-high population density (between 27 and 55 people per acre)
3. Schools (preschools, K-12, and higher education—except UW)
4. University of Wisconsin campus
5. Bus stops, transit centers, and park and rides (bus stops did not factor into the bike heat map)
6. Shopping (regional centers and big boxes)
7. Major employers
8. Government centers
9. Grocery stores
10. Libraries
11. Medical offices and hospitals
12. Parks
13. Post offices
14. Civic/event centers
15. Paths

Weighted scores were assigned to each factor, based on distance, regardless of whether each individual feature is currently accessed by walking or biking with any regularity. For example, the areas within one-quarter mile of a school get a higher score than areas between 1 and 2 miles of the same school, even if the school is in an area that is currently not walkable or bikeable. This was done intentionally since it indicates the latent or pent-up demand for improved bicycle and pedestrian conditions.

The resulting generalized maps, shown in Figure 3.05-1 and Figure 3.05-2, suggest areas with potential for significant numbers of bicycling and walking trips. The primary differences between the bicycle and pedestrian maps include reduced buffer distances around traffic generators for the pedestrian map and the inclusion of standard bus stops as a factor in the walking map. In general, both maps show the greatest concentrations of demand along Park Street north of the Beltline, Verona Road south of the Beltline, and University Avenue east of the Beltline.

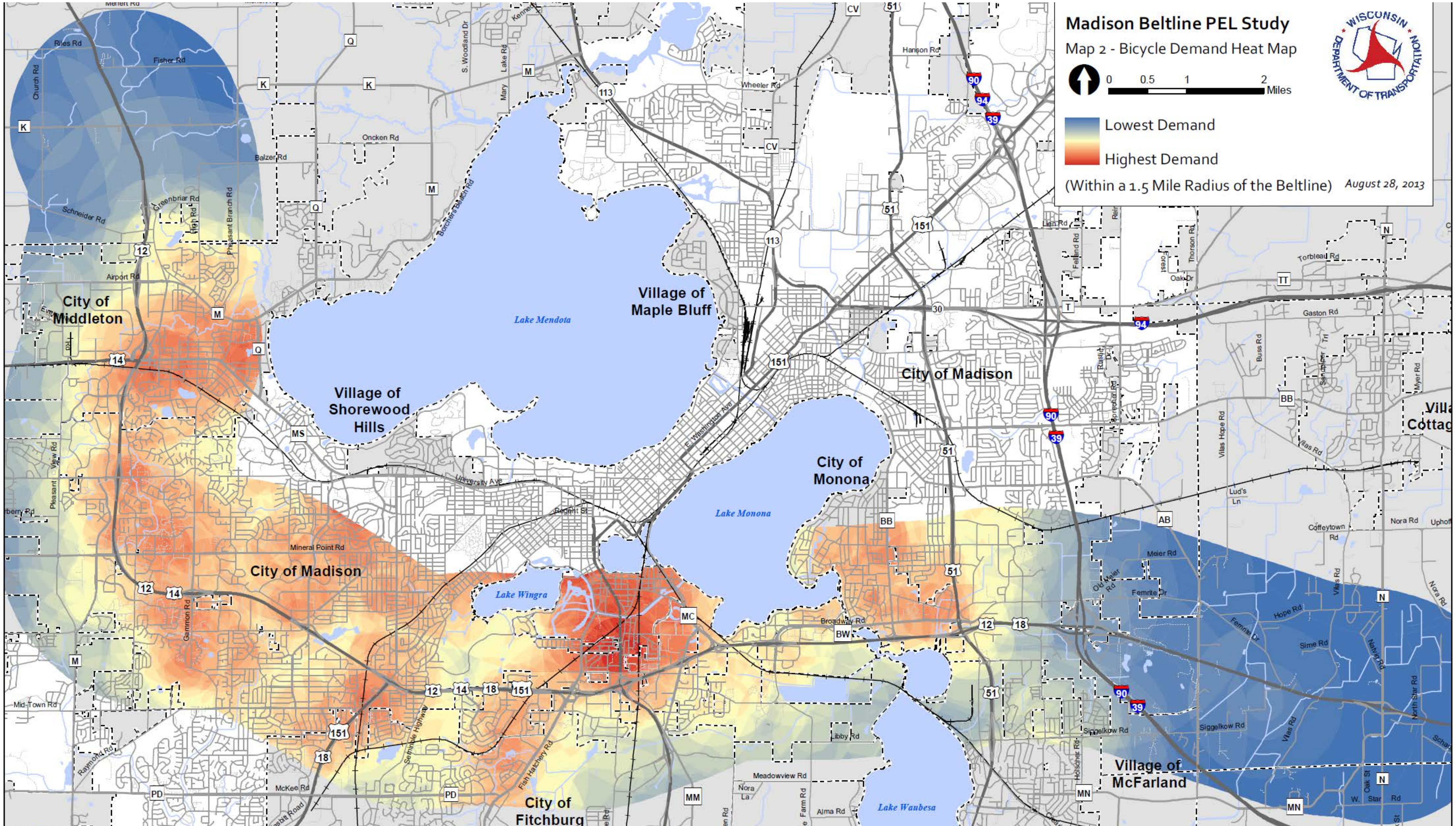

Figure 3.05-1 Beltline PEL Bicycle Demand Heat Map

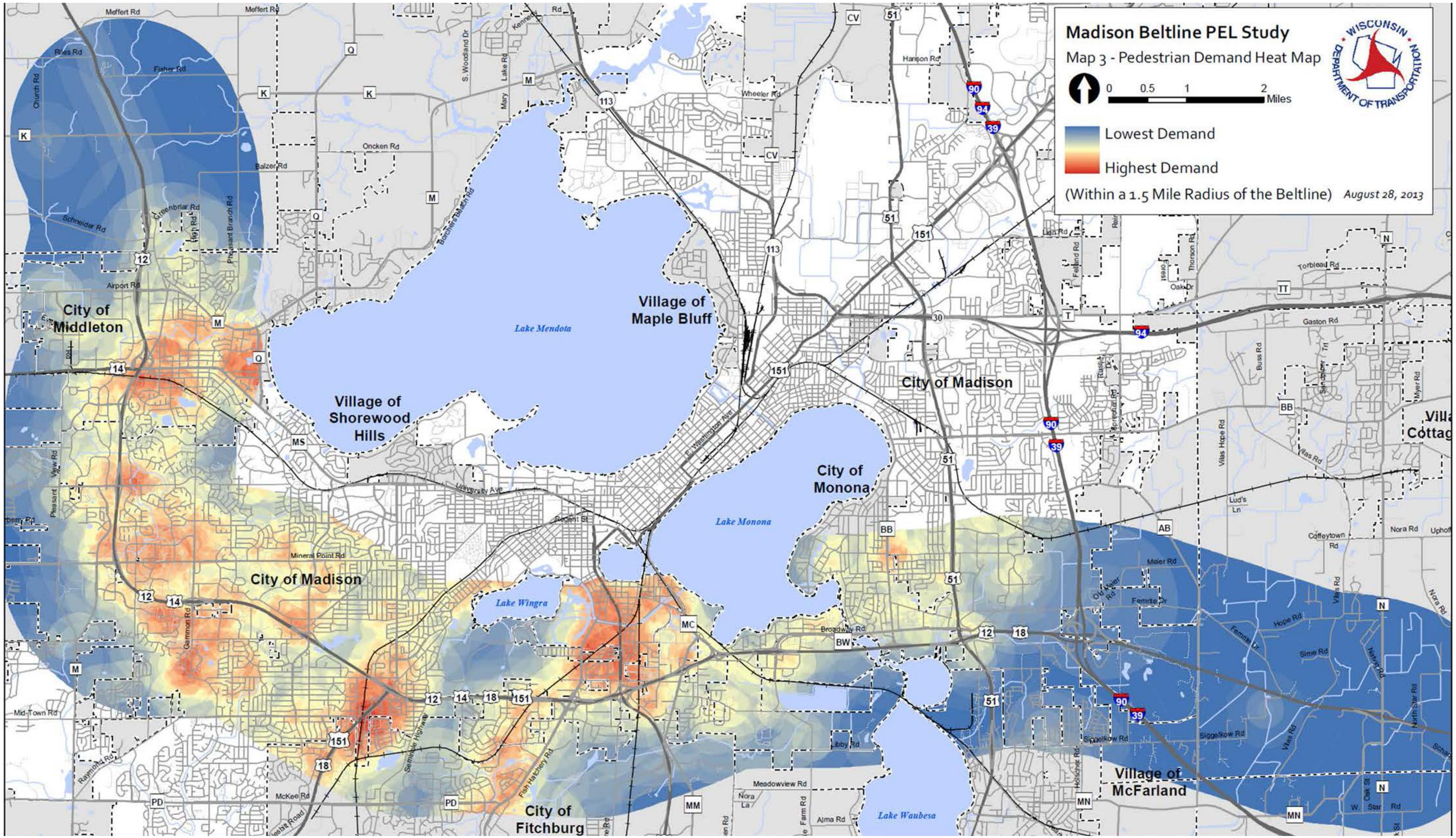

Figure 3.05-2 Beltline PEL Pedestrian Demand Heat Map

3.06 CROSSINGS

The Beltline, like any limited-access roadway, acts as a barrier for bicycle and pedestrian mobility because of its limited number of crossings. Therefore, the comfort and convenience of each crossing is especially important for people walking or biking within the area. For this study, 31 crossings of the Beltline were inventoried and analyzed in terms of their proximity to destinations, location along bicycle routes of significance, and general safety and comfort. These crossings take the form of roadway interchanges, noninterchange street crossings, and dedicated bicycle and pedestrian underpasses and overpasses. Many factors contribute to the overall comfort and convenience of each:

1. Road geometry, including presence of slip ramps and turn lanes (for interchange crossings)
2. Pavement conditions
3. Proximity to destinations
4. Location along significant bicycle corridors
5. Traffic volumes (ADT) and speeds
6. Presence of sidewalks, bike lanes, paths, or other accommodations

A. Crossing Rating System

For this study, crossings have been rated based on the following methodology, which blends quantitative and qualitative analysis. The Composite Level of Service (LOS) Rating is an indication of the perceived LOS and safety at each crossing. The Composite Proximity Rating is a factor of the direct proximity of the crossing to bike and pedestrian destinations as well as the crossing's location relative to established bicycle corridors. The purpose of these ratings is to help identify those crossings that are very important yet less safe or not very accommodating for bicycles or pedestrians.

For the Composite LOS Rating:
Low Scores (1-2) = Easy to Use High Scores (4-5) = Difficult to Use

For the Composite Proximity Rating:
Low Scores (1-2) = Close or Convenient High Scores (4-5) = Far or Inconvenient

The LOS concept is a widely used method for estimating how a piece of infrastructure will perform for different types of users based on a variety of parameters. LOS for cars is most commonly a measure of traffic congestion. LOS for bicycles and pedestrians, however, is typically a measure of the perceived safety and ease of use of a street, sidewalk, or path. It is also a good indication of how likely people are to use a particular piece of infrastructure. This analysis incorporates the 2010 Highway Capacity Manual (HCM) model for Bicycle LOS. The Pedestrian LOS model used was developed specifically for this exercise; established models were not used because of a lack of existing data.

While LOS is a good indication of the ease of use of a facility, it does not indicate whether the facility is convenient or highly useful for bicycles and pedestrians. A crossing with a near-perfect LOS rating is only marginally useful if it is far from the destinations and land uses that attract bicycles and pedestrians or if it is not along a path or bikeway leading to these locations. Therefore, it is important to consider the existing and latent demand for the bicycle and pedestrian use of each crossing. The

Composite Proximity Rating relates to the heat maps shown in Figure 3.05-1 and Figure 3.05-2. The scores generated by the Pedestrian Heat Map are directly incorporated into this rating. The Corridor Proximity score is derived by identifying whether the crossing is along a bikeway that connects hotspots shown in the Bicycle Heat Map. In addition, the presence of viable alternative crossings affects this rating. A crossing without any nearby alternatives becomes much more important for bicyclists and pedestrians, even if it does not have destinations close by.

While these ratings indicate the crossings that should be targeted for improvement, this analysis should not preclude adding or improving a crossing where the opportunity exists to do so. Every crossing of the Beltline is a valuable opportunity to improve bicycle and pedestrian mobility, regardless of whether there are high-demand destinations within the immediately proximity. In addition, if modifications to an existing crossing allow minor improvements that would encourage more bicycles and pedestrians, such as adding a striped buffer to an existing bike lane, such opportunities should not be passed. Lastly, development along the Beltline is ever changing. A crossing with a seemingly low proximity score today could dramatically change with new development or changed land uses.

Tables 3.06-1 and 3.06-2 explain the basis and calculation of each rating. For both ratings, low scores indicate more comfortable and/or useful crossings while high scores indicate less comfortable and/or less useful crossings.

Bicycle LOS	**Weight: 25%**
As calculated by the MATPB utilizing 2010 HCM methodology. This calculation factors vehicle traffic volumes, traffic speeds, presence of bike lanes or other accommodations, and certain road geometry aspects (number of lanes, lane widths, etc.).	The Bicycle LOS score for segments approaching the crossing is used (where two segments approach the crossing, the higher score is used). Scores range from less than 1 to more than 5.
Pedestrian LOS	**Weight: 25%**
While formal pedestrian LOS models exist, an *adhoc* pedestrian LOS scheme was developed for this exercise because of a lack of existing data. This scheme considers the street segments approaching the crossing (generally from the crossing to the next intersection) and estimates the quality of the street for pedestrian use.	1=Sidewalks on both sides, generally with a 5-foot separation from the street, and crosswalks present at intersections. 2=Sidewalks on both sides, perhaps missing separation from the street and/or missing 1 or 2 crosswalks 3=Sidewalk missing on one side <u>or</u> no crosswalks 4=Sidewalk missing on one side <u>and</u> no crosswalks 5=No sidewalks present
Crossing Design	**Weight: 50%**
The physical designs of crossings affect the ease of use for cyclists and pedestrians. Examples include free-flowing slip lanes at interchanges, which are considered a challenge to cyclists, and dedicated bike/pedestrian overpasses and underpasses, which are considered a benefit.	1=Dedicated Over/Underpass 2=Noninterchange street crossing 3=Full interchange without slip lanes and/or half interchange 4=Full Interchange with one free-flowing slip lane 5=Full Interchange with two free-flowing slip lanes 6=Full Interchange with three or four free-flowing slip ramps (Add 1 point for missing sidewalk) (Add 1 point for missing bike lanes)

Table 3.06-1 Composite LOS Ratings

Corridor Proximity	**Weight: 33 percent**
The usefulness of a crossing for bicycles is based on the crossing's relationship to the regional bicycle network.	Scores are based on the degree to which the crossing is in proximity to a corridor with adequate bike facilities as well as the corridor's overall connectivity to major destinations. Scores range from 1 to 6 (most connected and direct to least connected and direct).
Destination Proximity	**Weight: 33 percent**
The usefulness of a crossing for pedestrians is based on its proximity to destinations.	The pedestrian heat map is used to generate this score. Scores range from 1 to 6.
Proximity of Viable Alternatives	**Weight: 33 percent**
The relative importance or usefulness of a crossing is a factor of whether viable alternative crossings exist. The lack of viable alternatives increases this score and the overall Composite Proximity Rating.	Scores are calculated as the inverted average of the Composite LOS scores for the next two adjacent crossings, weighted for distance (full scores are used when crossings exist within 1/2 mile; 50 percent of the scores are used when next adjacent crossings are more than 1/2 mile away).

Table 3.06-2 Composite Proximity Ratings

B. Crossing Inventory

In total, 31 crossings of the Beltline exist within the study area. Of these, 14 are full or partial interchange crossings, 4 are noninterchange street overpasses or underpasses, 5 are at-grade street crossings, and 8 are dedicated bicycle and pedestrian crossings. Tables 3.06-3 and 3.06-4 list each crossing's Composite LOS Rating and Composite Proximity Rating, respectively. Figure 3.06-1 illustrates the locations of each of the crossings analyzed during this exercise.

Location	Type	Bicycle LOS	Pedestrian LOS	Design Score	Composite LOS Rating
County K	Street At-Grade	3.0	5	5	4.5
Schneider Road	Sidepath	1.0	2	2	1.8
Airport Road	Street Interchange	1.9	1	4	2.7
Discovery Drive / Pheasant Branch Trail	Street Underpass / Path	1.0	1	1	1.0
University Avenue	Street Interchange	3.3	4	5	4.3
Terrace Avenue	Street Underpass	1.8	1	2	1.7
Greenway Boulevard	Street Interchange	3.8	1	5	3.7
Old Sauk Road	Street Interchange	3.2	1	3	2.6
Mineral Point Road	Street Interchange	4.8	4	3	3.7
High Point Road	Street Overpass	2.7	2	2	2.2
Gammon Road	Street Interchange	5.6	2	5	4.4
Struck Street Trail	Path Underpass	1.0	1	1	1.0
Whitney Way	Street Interchange	4.6	2	6	4.7
Southwest Commuter Path	Path Overpass	1.0	1	1	1.0
Verona Road	Street Interchange	7.3	2	5	4.8
Whenona Drive Connector	Path Overpass	1.0	1	1	1.0
Seminole Highway	Street Partial Interchange	3.1	4	3	3.3
Arboretum	Path Underpass (No Bikes)	6.0	1	1	2.3
Todd Drive	Street Partial Interchange	3.1	2	3	2.8
Cannonball Path	Path Overpass	1.0	1	1	1.0
Fish Hatchery Road	Street Interchange	6.1	3	4	4.3
Badger Road Connector	Path Overpass	1.0	1	1	1.0
Rimrock Road	Street Interchange	3.2	3	4	3.6
Capitol City Trail	Path Underpass	1.0	1	1	1.0
South Towne Drive/Broadway	Street Interchange	3.7	4	4	3.9
Stoughton Road / US 51	Street Interchange / Sidepath	3.5	4	5	4.4
Marsh Road/ Agricultural Drive	Street Overpass	2.2	2	2	2.1
Country AB	Street At-Grade	3.7	5	5	4.7
Femrite Drive	Street At-Grade	3.4	5	5	4.6
Vilas Road	Street At-Grade	3.5	5	5	4.6
County N	Street At-Grade	3.4	5	5	4.6

Table 3.06-3 Crossing Inventory (Composite LOS Rating)

Location	Type	Corridor Proximity Score	Destination Proximity Score	Viable Alternatives Score	Composite Proximity Rating
County	Street At-Grade	5	5.3	2.1	**4.1**
Schneider Road	Sidepath	4	4.1	1.2	**3.1**
Airport Road	Street Interchange	3	4.2	2.3	**3.2**
Discovery Drive / Pheasant Branch Trail	Street Underpass / Path	2	3.4	1.7	**2.4**
University Avenue	Street Interchange	3	2.6	4.7	**3.4**
Terrace Avenue	Street Underpass	3	2.1	2.0	**2.4**
Greenway Boulevard	Street Interchange	4	3.7	3.0	**3.6**
Old Sauk Road	Street Interchange	1	3.0	1.2	**1.7**
Mineral Point Road	Street Interchange	1	3.3	2.8	**2.4**
High Point Road	Street Overpass	2	3.3	1.6	**2.3**
Gammon Road	Street Interchange	3	3.3	3.5	**3.3**
Struck Street Trail	Path Underpass	1	3.0	1.1	**1.7**
Whitney Way	Street Interchange	3	3.0	2.5	**2.8**
Southwest Commuter Path	Path Overpass	1	2.7	0.9	**1.5**
Verona Road	Street Interchange	4	2.2	5.0	**3.7**
Whenona Drive Connector	Path Overpass	4	2.6	2.0	**2.9**
Seminole Highway	Street Partial Interchange	1	3.7	4.4	**3.0**
Arboretum	Path Underpass (No Bikes)	6	4.2	2.2	**4.1**
Todd Drive	Street Partial Interchange	3	3.7	3.4	**3.4**
Cannonball Path	Path Overpass	1	3.0	2.5	**2.2**
Fish Hatchery Road	Street Interchange	1	4.0	3.8	**2.9**
Badger Road Connector	Path Overpass	5	2.5	1.0	**2.8**
Rimrock Road	Street Interchange	1	3.4	2.5	**2.3**
Capitol City Trail	Path Underpass	1	3.8	1.1	**2.0**
South Towne Drive/Broadway	Street Interchange	3	3.1	1.7	**2.6**
Stoughton Road / US 51	Street Interchange / Sidepath	5	3.9	1.5	**3.5**
Marsh Road/ Agricultural Drive	Street Overpass	2	5.3	0.7	**2.7**
Country AB	Street At-Grade	4	6.0	1.3	**3.8**
Femrite Drive	Street At-Grade	5	5.7	0.7	**3.8**
Vilas Road	Street At-Grade	3	6.0	0.7	**3.2**
County N	Street At-Grade	4	6.0	0.7	**3.6**

Table 3.06-4 Crossing Inventory (Composite Proximity Rating)

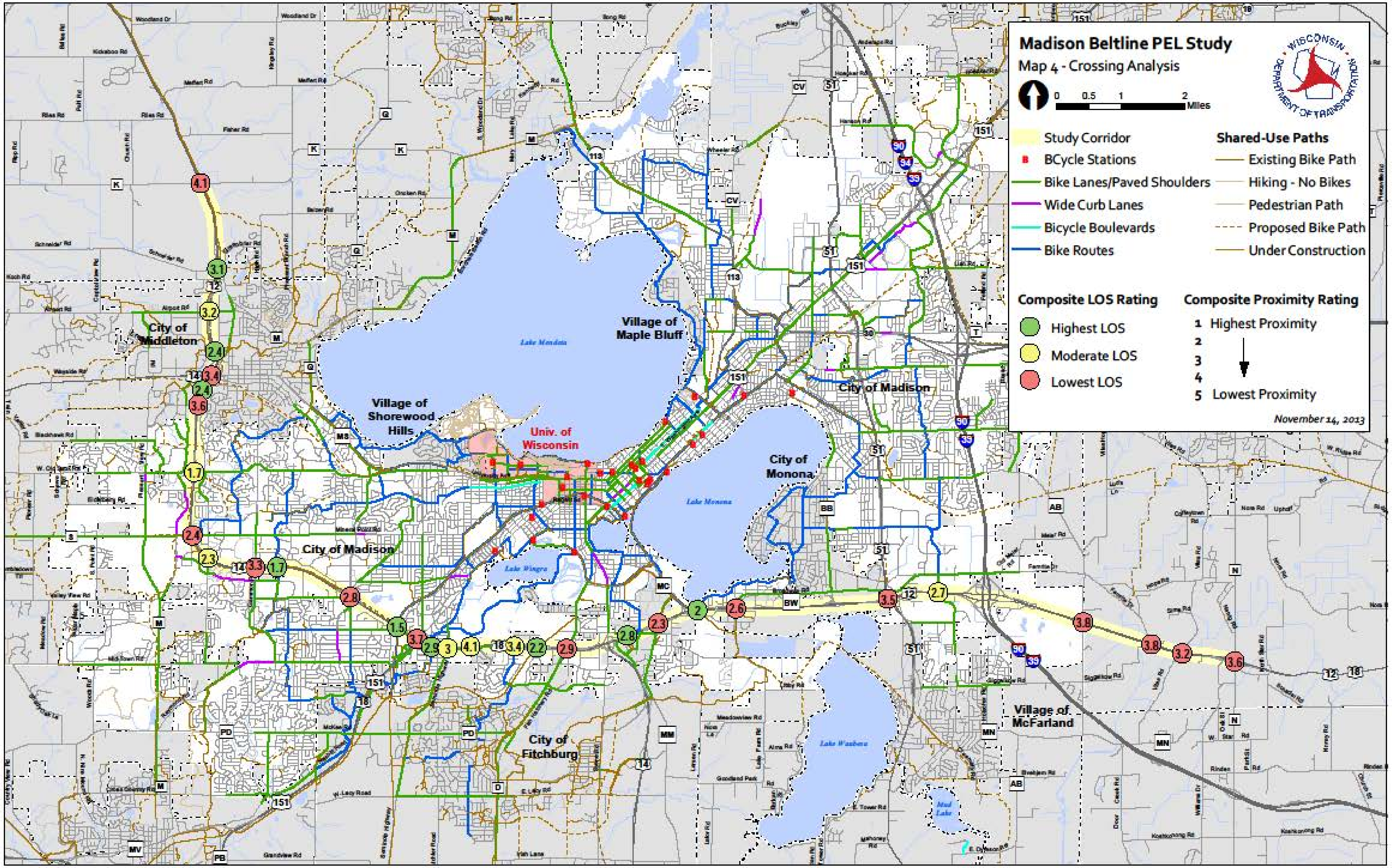

Figure 3.06-1 Beltline PEL Crossing Analysis

C. Crossing Analysis

In general, crossings with poor Composite LOS Ratings and good Composite Proximity Ratings should be targeted for improvement, either through enhancements to that specific crossing or the incorporation of a new dedicated crossing for bicycles and pedestrians.

The most common issues resulting in poor Composite LOS Ratings for crossings include:

1. Poor Bicycle LOS on the approaches to a crossing (typically a result of high traffic volumes and narrow or nonexistent bike lanes).
2. Lack of sidewalks on one or both sides of the street on the crossing approaches.
3. Lack of bike lanes and/or sidewalks on the crossing itself.
4. Presence of free-flowing slip lanes, which allowing cars to pass through the interchange at high speeds, potentially across bike lanes.

Figure 3.06-1 and Table 3.06-3 show the Composite LOS Rating for each of the crossings analyzed during this exercise. Crossings with the best Composite LOS Ratings are dedicated bicycle and pedestrian overpasses. The shared crossings (which utilize on-street bikeways) with the best Composite LOS Ratings include Terrace Avenue, Schneider Road, and Agricultural Drive/Marsh Road. These crossings tend to have low traffic volumes, adequate bikeways, and continuous sidewalks. The crossings with the poorest Composite LOS Ratings are Verona Road, Whitney Way, and County AB. These crossings have very high traffic volumes and may also lack adequate bike lanes or have discontinuous sidewalks. County AB, Vilas Road, County N, Femrite Drive, and County K are at-grade crossings, which increase the challenge for pedestrians and bicyclists.

The characteristics resulting in good Composite Proximity Ratings for crossings include:

1. Location along a major bikeway corridor.
2. Proximity to major destinations.
3. Poor Composite LOS Ratings for the next two adjacent crossings (indicating a lack of viable alternatives).

As depicted on Table 3.06-4, the crossings with the best Composite Proximity Rating are the Southwest Commuter Path overpass, the Struck Street Trail underpass, Old Sauk Road, and the Capital City Trail underpass. These four crossings rise to the top of the list because they are along established bicycle routes, which improves their overall Composite Proximity Rating. It is not surprising that three of these crossings are dedicated for bicycle and pedestrian use. Old Sauk Road is also rated highly because of its proximity to a number of destinations and presence of continuous bike lanes along Old Sauk Road/Old Middleton Road leading to the Blackhawk Path, which leads directly to the University of Wisconsin.

Also receiving good Composite Proximity Ratings are several major streets, including Rimrock Road and Mineral Point Road. While these are generally not high LOS crossings (as demonstrated by their respective Composite LOS Ratings of 3.6 and 3.7), they are proximate to numerous destinations. Also, streets such as these could potentially be very useful to bicyclists if comfortable facilities (such as buffered bike lanes or side paths) were provided.

Examples of crossings with poor Composite LOS Ratings and good Composite Proximity Ratings include South Towne Drive/Broadway, Rimrock Road, Mineral Point Road, and Whitney Way. In other words, these crossings have been identified as very important for bicycle and pedestrian mobility, but they are challenging for bicyclists and pedestrians because of traffic volumes or the design of the infrastructure. These crossings should be targeted for improvements in the future.

The Southwest Path overpass, shown in Figure 3.06-2, has a good Composite LOS Rating and a good Composite Proximity Rating. Verona Road, shown in Figure 3.06-3, is close to a number of major destinations, but has a poor Composite LOS Rating because of its lack of bike lanes and high traffic volumes. In addition, the nearby Southwest Path overpass is a more attractive alternative for bicyclists.

Figure 3.06-2 Southwest Commuter Path Overpass–Good Crossing

Figure 3.06-3 Verona Road Interchange–Poor Crossing

3.07 LINEAR CONNECTIONS

A. Parallel Routes for Bicycles

In addition to crossing the Beltline, access in a linear fashion is also important because of the large number of businesses and neighborhoods within the corridor. For bikes, routes immediately adjacent to the Beltline (such as its frontage roads) can provide good access. However, streets and paths not immediately adjacent but within a reasonable distance (providing access to business along the Beltline) can also serve the same purpose.

Figure 3.07-1 depicts the most parallel routes on the north and south sides of the Beltline. These routes include paths and streets, both with and without dedicated bicycle facilities. In other words, some portions of these routes follow streets that would not be comfortable for the average adult cyclist. Furthermore, it is not expected that a bicyclist would desire to ride such a parallel route from one end of the corridor to the other. Rather, the purpose of this analysis is to illustrate the routes that are most parallel to the Beltline, regardless of Bicycle LOS, in order to demonstrate the lack of parallel connections and presence of major barriers.

The analysis depicted in Figure 3.07-1 reveals the following:

1. In general, parallel routes close to the Beltline are available along much of the corridor. However, following these routes would require bicyclists to cross the Beltline multiple times.

2. Parallel routes close to the Beltline are available on both sides from the northern/western extent of the study area to the Whitney Way interchange.
3. Between Whitney Way and Verona Road, bicyclists on the northern side of the Beltline are required to take Odana Road heading east to southbound Midvale Boulevard in order to get around the Odana Hills Golf Course. This is a detour of more than 0.5 miles compared to the straight-line distance.
4. On the north side of the Beltline between Seminole Highway and Fish Hatchery Road, bicyclists are routed along Arboretum Drive and down Fish Hatchery Road to Badger Road. This is a detour of more than 1.2 miles compared to the straight-line distance.
5. In order to cross Park Street on the south side of the Beltline, bicyclists must go south on Syene Road to the Capital City Trail or McCoy Road, then north on County MM and Ski Lane. This is a detour of more than 2.6 miles compared to the straight-line distance.
6. Between South Towne Drive and Stoughton Road, Broadway is a continuous parallel route with a relatively good ease of use (although the Frazier Avenue, Monona Drive, and Stoughton Road intersections are challenging). However, there is not a direct parallel connection for bicyclists on the south side of the Beltline. Because of the Yahara River, Upper Mud Lake, and associated marshlands, there are not any destinations for bicyclists along this portion of the Beltline. On the other hand, if a bicyclist wished to parallel the south side of the Beltline in this area, it would require heading south on South Towne Drive to existing and planned portions of the Capitol City Trail, then over to Terminal Drive. This route is 2.2 miles longer than the straight-line distance. A planned path crossing the river between Upper Mud Lake and Lake Waubesa would alleviate this problem.
7. East of Stoughton Road, the number of parallel routes for bicycles quickly declines, namely because of the undeveloped nature of this area and the low-density road network that accompanies it. Femrite Drive (although narrow and with poor pavement conditions) and Hope Road link to create a good route in terms of proximity and parallel orientation. Combined with Broadway, this route provides the longest continuous parallel connection along the entire extent of the study area. However, the connection from Hope Road to County N requires bicyclists to make numerous turns, which not only increases the length of the route but also potentially creates wayfinding challenges. In addition, there are not any parallel routes south of the Beltline and north of I 39/90. As such, there is a lack of connectivity to the area that includes the Yahara Hills Golf Course, Ho-Chunk Casino, and other businesses.

In addition to what is shown in the map, there are several site-specific challenges affecting what are otherwise acceptable parallel routes:

1. The frontage road on the north side between Todd Drive and Fish Hatchery Road has relatively high motor vehicle traffic volumes and the braided ramps are very challenging for bicyclists.
2. Left turns are not allowed from the eastbound southern frontage road (near Fish Hatchery Road) onto Greenway Cross. Bryant Road (parallel to Fish Hatchery Road)

allows left turns, but it would need improvements to serve bicyclists. The prohibited left turn is a significant source of indirection.

3. Junction Road and High Point Road both provide good parallel routes in the western portion of the study area. However, complete bike lanes are needed to increase the Bicycle LOS of these roads.

4. Old Sauk Road is a barrier for the parallel routes on the west side of the Beltline. Crossing this road while traveling north along Excelsior Drive is not possible since traffic is forced to turn right.

B. Missing Sidewalks

From a pedestrian perspective, there is a much lower tolerance for diversion away from the Beltline. Pedestrians are typically unwilling to accept detours that add more than a few minutes to their trip. Often, if sidewalks are not provided, able-bodied pedestrians will walk along the edge of the right-of-way while people in wheelchairs will often use the shoulder or outside lane of a street.

Figure 3.07-2 illustrates the location of missing sidewalks. These missing sidewalks are only identified for portions of the Beltline frontage roads that provide access to businesses. While portions of the Beltline in far west Madison and Middleton do not provide sidewalks, they also do not provide access to businesses (rather, businesses front parallel surface streets that provide sidewalks). In addition, this analysis only considers frontage roads or streets that effectively serve as frontage roads.

There are four key areas with missing sidewalks:

1. Near Gammon Road, West Platte Drive/Grand Canyon Drive and Seybold Road parallel the Beltline, provide direct access to businesses, and lack sidewalks. Both of these streets connect to the Struck Street Trail Underpass and would otherwise provide pedestrian access to businesses near the Gammon Road interchange. In total, there are approximately 0.8 miles of missing sidewalk in this area.

2. The most significant lack of sidewalks occurs along the south side of the Beltline between Verona Road and Park Street. Sidewalks are generally lacking along the entirety of this portion of the corridor, although segments exist near Todd Drive. As a result, pedestrian access is cut off between the Dunn’s Marsh and Arbor Hills Neighborhoods, as are connections from both of these neighborhoods to the retail centers at Verona Road and at Todd Drive. This area has a large amount of multifamily housing, which tends to generate greater levels of pedestrian activity compared to single-family housing. To the west, there are fewer residences, but many more businesses, including several large employers. In total, there are approximately 3.3 miles of missing sidewalk along this portion of the corridor.

3. The area between Rimrock Road and South Towne Drive/Broadway is missing approximately 1.8 miles of sidewalk. While there are both business and residences along this portion of the Beltline, the nature of this area is industrial. As such, sidewalks will primarily benefit people walking to work and will support the existing transit presence in this area.

4. Finally, sidewalks do not exist between Copps Avenue and Stoughton Road along Broadway. This is an important pedestrian connection because of the park and ride along Dutch Mill Road.

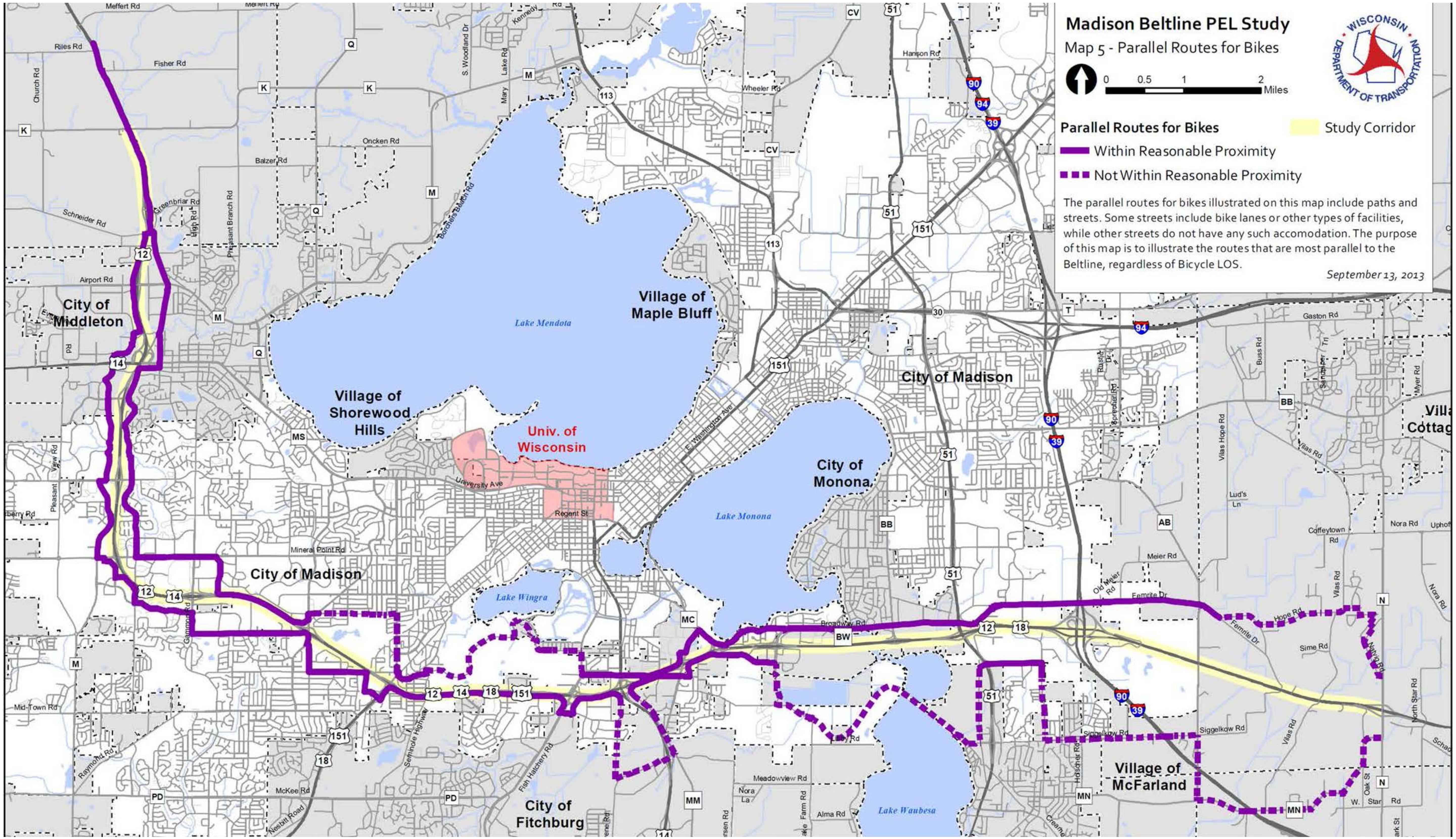

Figure 3.07-1 Parallel Routes for Bikes

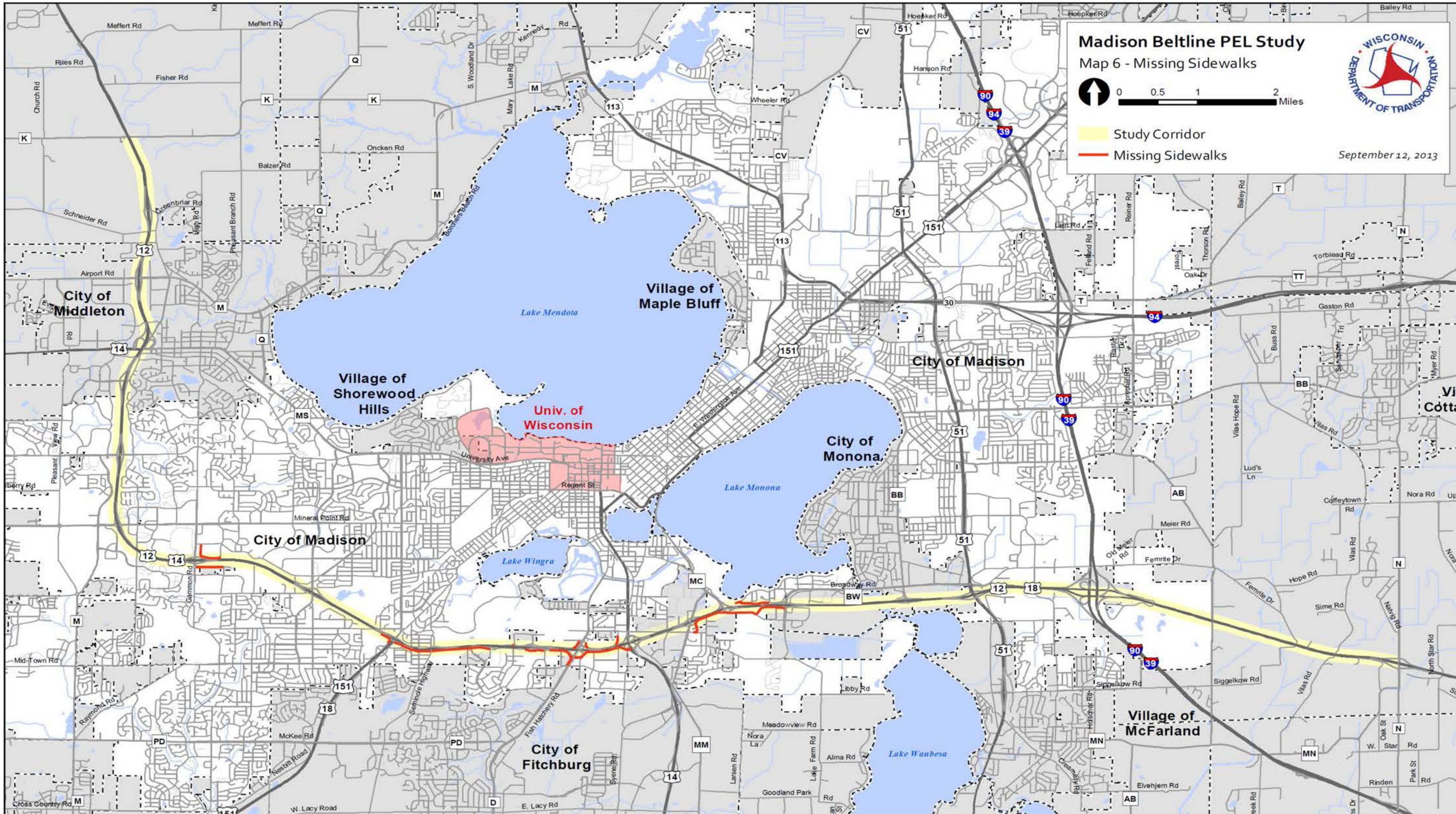

Figure 3.07-2 Missing Sidewalks